



Electric Vehicles and Infrastructure in New Hampshire



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NH Department of Environmental Services

February 15, 2013

Granite State Clean Cities Coalition



- Air Resources Division Program
- 112 stakeholders
- Alternative fuels and vehicles, idle reduction, fuel economy
- Biodiesel, Compressed Natural Gas, Electricity, Ethanol, Hydrogen, Propane



Partnerships, Collaborations



- State Agencies
- Cities of Concord, Nashua
- NH Electric Cooperative
- PSNH



Electric Vehicles (EVs) are Here!



GM Chevy Volt (40 miles)



Mitsubishi iMiEV (62 miles)



Nissan Leaf (60-100 miles)



2014 Chevy Spark (60 miles)



2013 Ford Focus (100 miles)



Tesla Model S (160 miles)

Electric Vehicle Fueling



Level 1 charging



Level 2 charging



Level 3 charging

Where to Charge?



Alternative Fuels Data Center: Alternative Fueling Station Locator - Windows Internet Explorer

http://www.afdc.energy.gov/locator/stations/#results?utf8=%E2%9C%93&location=nh&filtered=true&fuel=ELEC&owner=all&payment=...

Share Browser WebEx

Gov. Jennifer M. Granholm ... Plugin...Recharge! Calculat... Hypermiling To Boost A Cars... Electric Car Improvements GM hopes new Spark will jolt...

Alternative Fuels Data Center: Alternative Fueling Sta...

nh

Electric

[more search options](#)

13
electric stations
in New Hampshire

Excluding private stations

[Download spreadsheet of matching stations](#)

Location details are subject to change. We recommend calling the stations to verify location, hours of operation, and access.

Map data ©2012 Google - Terms of

[Data Download](#) [Developer To](#)

Internet 120%



ELECTRIC
VEHICLE
PARKING
ONLY



ELECTRIC
VEHICLE
CHARGING
STATION







EVSEs (Electric Vehicle Supply Equipment)

Location?

How many units on each site?

How many sites?

Local and state codes?

What about signage?

What is the price of electricity?

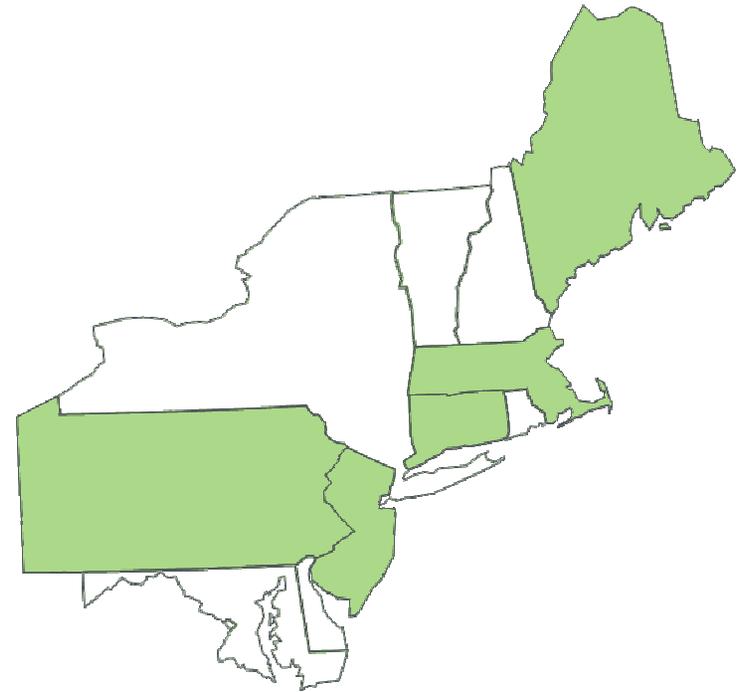


Transportation Climate Initiative (TCI)



11 state and District of Columbia collaboration of public agencies tackling transportation issues on a regional level

- 🚗 Reduce greenhouse gases in the transportation sector;
- 🚗 Create benefits and funding opportunities for states that are leading the way;
- 🚗 Align with federal government actions, goals and emerging inter-agency approaches; *and*
- 🚗 Build on existing regional efforts.



DOE Electric Vehicle Readiness Grant



-  TCI/Northeast Electric Vehicle Network
-  NYSERDA
-  16 Clean Cities Coalitions (including Granite State Clean Cities Coalition)



THE WALL STREET JOURNAL

Northeast States Form Electric Vehicle Network

BALTIMORE — Ten states from Massachusetts to Maryland are joining forces to promote electric vehicles.

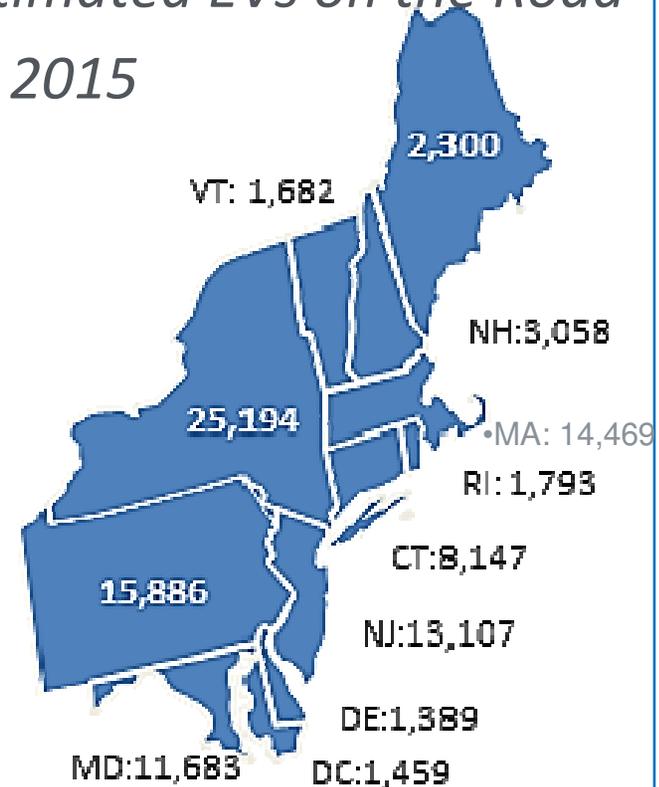
The Northeast Electric Vehicle Network announced Wednesday it will work to help plan and install charging stations throughout the region as well as attract private investment in clean vehicle infrastructure.

Literature Review



- 🔍 TCI's literature review assesses market barriers, electrical grid impacts, plans for EV rollouts, and other issues specific to the Northeast.
- 🔍 The literature review was prepared by the Center for Climate and Energy Solutions (C2ES) for TCI, the Georgetown Climate Center, and NYSERDA.
- 🔍 *The report is available on the guidance document website.*

Estimated EVs on the Road by 2015



Guidance Documents

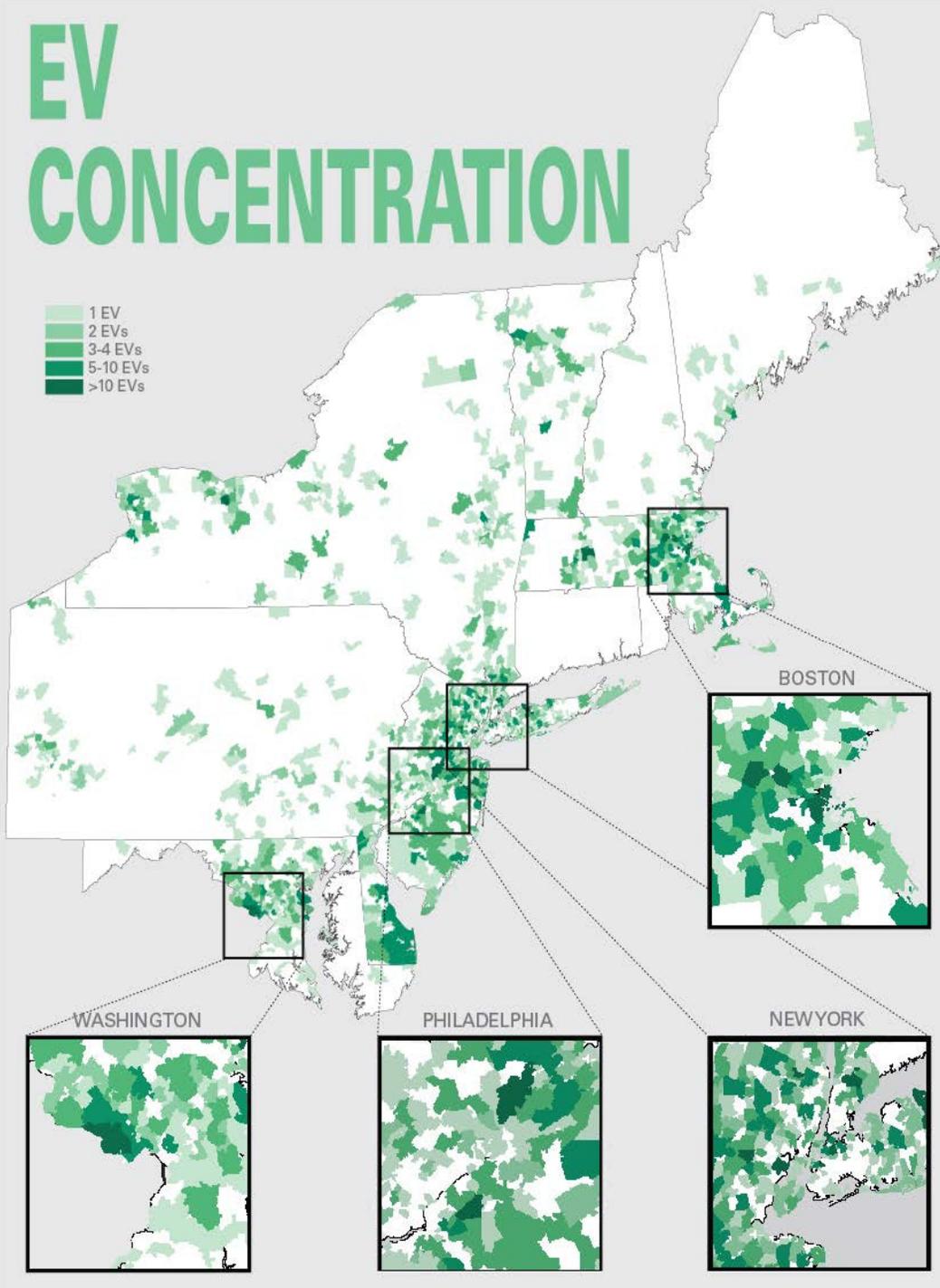


Under this grant the following documents were created:

-  *Assessment of Current EVSE and EV Deployment;*
-  *EVSE Cluster Analysis;*
-  *EV Siting and Design Guidelines;*
-  *EV-Ready Codes for the Built Environment; and*
-  *Creating EV-Ready Towns and Cities.*



EV CONCENTRATION



Assessment of Current EVSE and EV Deployment

-  Current EVSE/EV Deployment
-  Concentration of EVs by zip code

DEMOGRAPHICS*

The typical EV user is **YOUNGER**, more **EDUCATED**, is **WEALTHIER**, is a **RURAL AREA & SUBURBAN** dweller, and is employed in a **MANAGERIAL** capacity

All the above characteristics are greater in communities with **THREE OR MORE EVs**

> **YOUNGER**, tech savvy and eco-conscious

6% more population under 45

1.5Yrs younger median age

> **WEALTHIER** and perhaps desiring to show off the latest eco-purchase

38% higher median household incomes

47% more households with income \geq \$200,000

> **EDUCATED** and potentially more concerned with energy security

31% more bachelor's degrees

47% more graduate degrees

> **RURAL AREA & SUBURBAN DWELLER** living in stable neighborhoods

40% greater home values

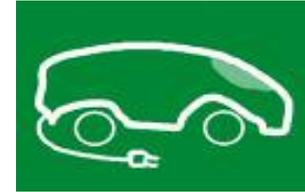
38% more homes with four or more bedrooms

> Diverse occupation and high percent in **MANAGERIAL** capacity

21% more management, business, science and arts roles

23% more in professional and scientific industries

*Based on census tracts



Deployment Assessment

🌐 Demographic trends

EVSE Cluster Analysis



Proposes nine land use “clusters” that are strong areas of current and potential EVSE deployment.

- ✦ Clusters were chosen based on:
 - ✦ User behavior;
 - ✦ Site’s operations;
 - ✦ External influences (geography/ demographics); and
 - ✦ Ability of the cluster to provide benefits to the EVSE host and wider public.
- ✦ Analysis also uses case studies to demonstrate how the clusters can effectively support EV use.

Medical Campus	Downtown
Higher Education	Workplace
Retail	Multi-Family
Leisure Destination	Regional Transit
Fleet and Freight	

Siting and Design Guidelines for EVSE

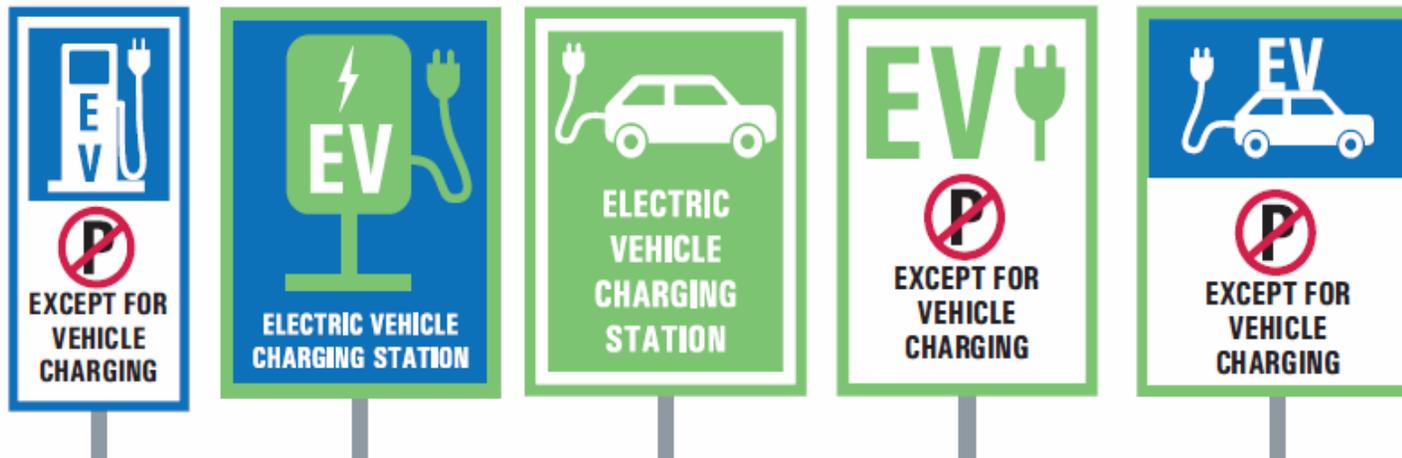


FIGURE 14.

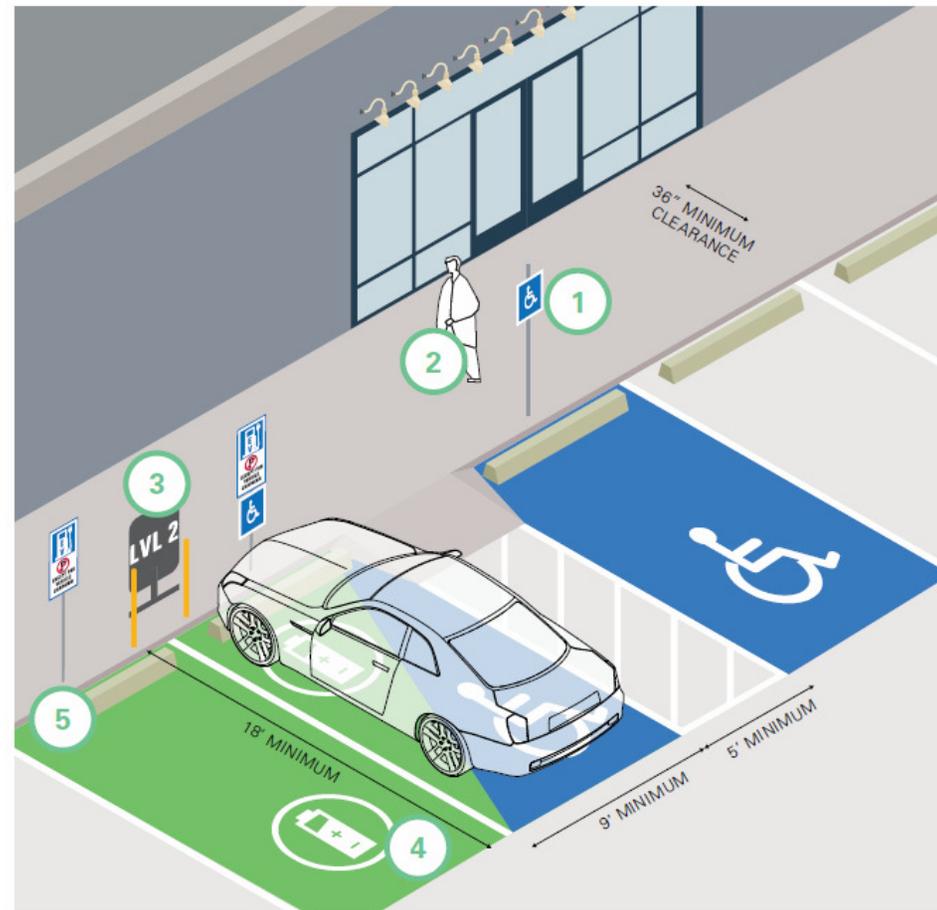
A COMBINATION OF SYMBOL AND TEXT IS RECOMMENDED. THE TERM "CHARGING" SHOULD BE USED TO ENSURE HYBRID VEHICLES DO NOT USE THE SPACES FOR PARKING. THE SELECTED ELECTRIC VEHICLE SYMBOL SHOULD BE LARGER AND MORE PRONOUNCED THAN THE NO-PARKING SYMBOL TO AVOID CONFUSING MESSAGES.

Siting and Design Guidelines



Commercial sites.

- ⚡ Signage is critical for finding stations in a busy lot.
- ⚡ Allow sufficient room for access pedestrian access, keep path clear for pedestrians.
- ⚡ Visible EVSE can help with green branding.
- ⚡ Carefully site EVSE to minimize cost (may be most cost effective to locate EVSE near electrical panel).

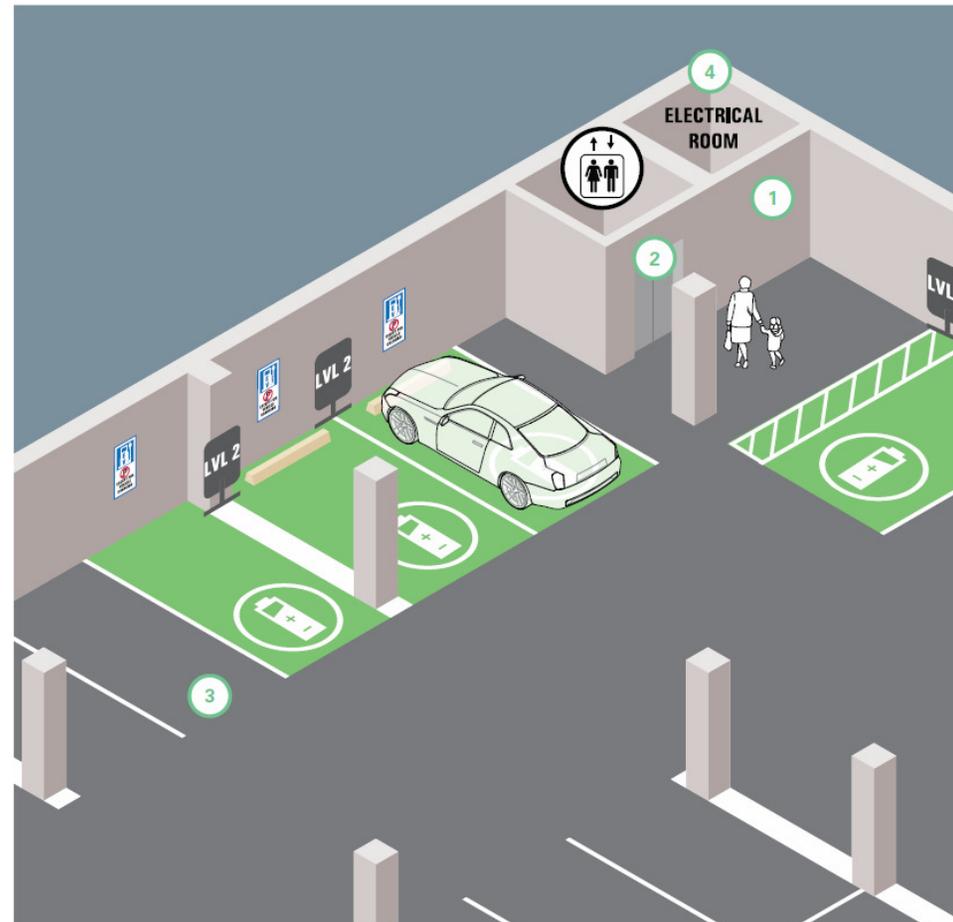


Siting and Design Guidelines



Multi-Unit Dwellings.

- ⚡ Consider how electricity consumption is metered and billed.
- ⚡ Consider distance to electrical panel, potential push-back from residents when siting EVSE.
- ⚡ Be creative when locating EVSE in a crowded garage – EVSE can be mounted on a wall when space is tight.
- ⚡ Check to make sure there is sufficient room in the electrical panel to accommodate EVSE installations.

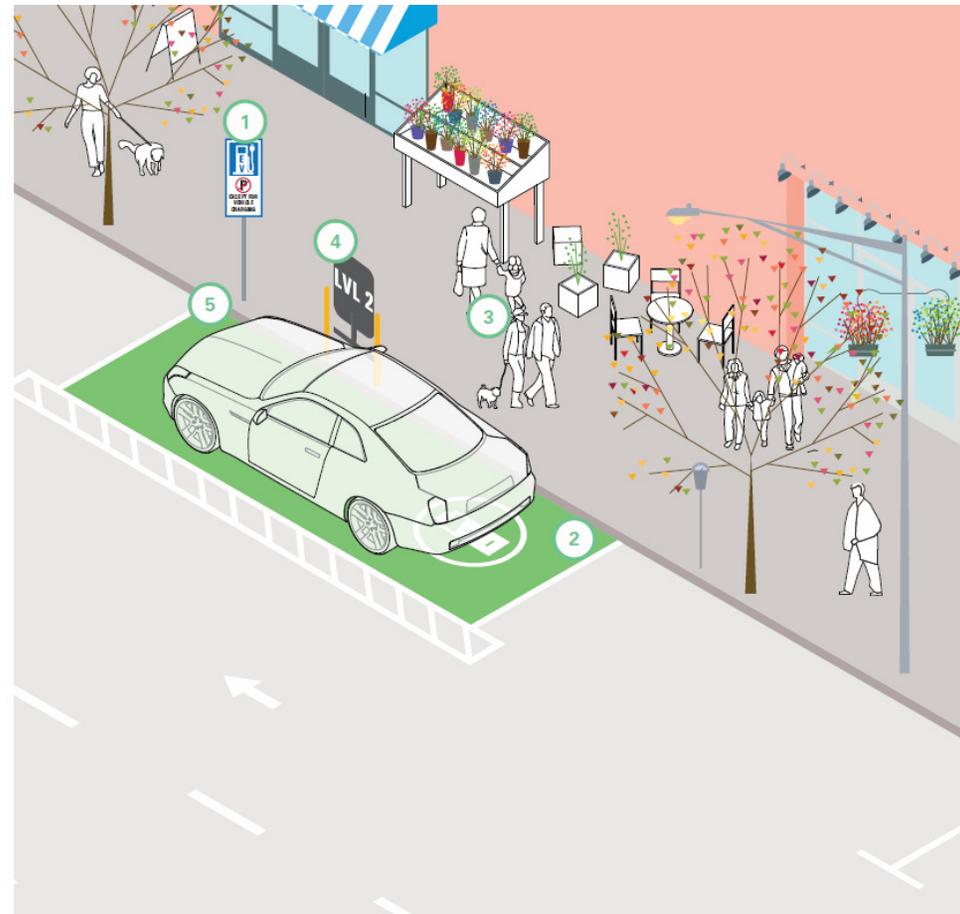


Siting and Design Guidelines



On-Street.

- ❶ Locate EVSE in prominent locations.
- ❷ Street markings can help identify EV spaces.
- ❸ Stations with a streamlined and simple design are desirable.
- ❹ On-street EVSE will need to draw power from a local business or street outlet.
- ❺ Allow sufficient space for the driver to plug-in their vehicle.

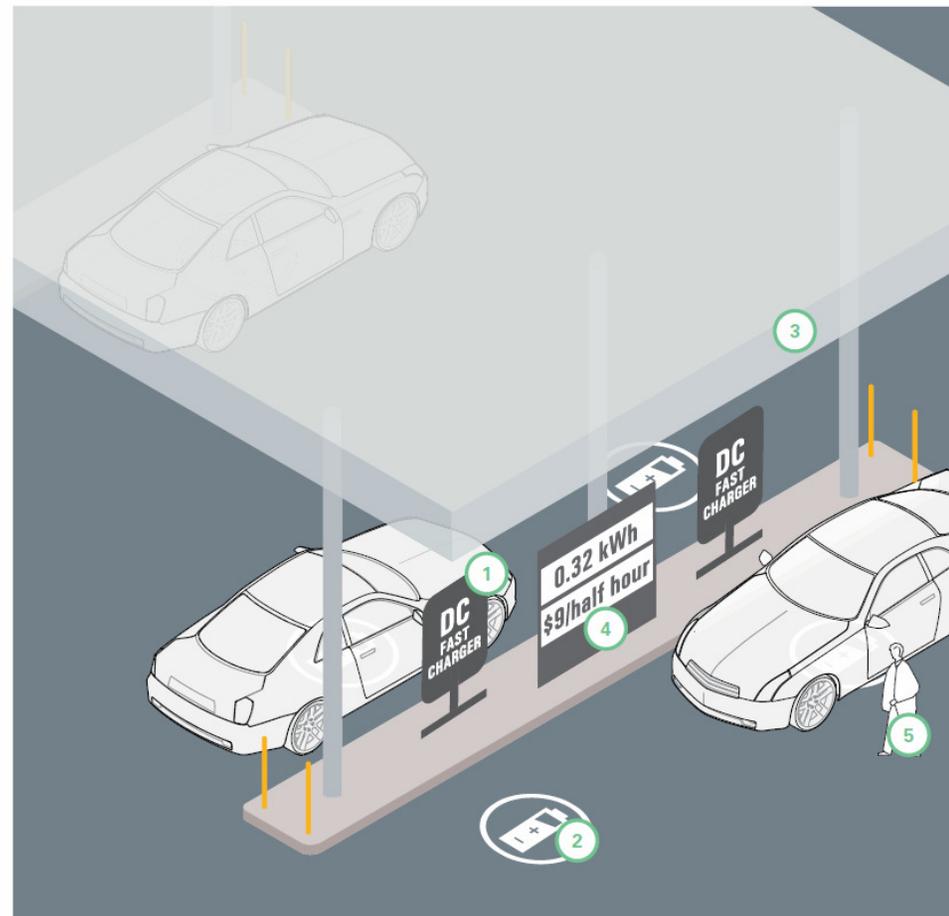


Siting and Design Guidelines



Service Station.

-  This location is appropriate for DC fast charging.
-  Clear markings are essential to distinguish from gasoline pumps.
-  Take care not to block other EVSE or pumps.
-  Protect DC fast chargers from the elements.
-  Establish an appropriate charge-for-charge model.
-  Customer amenities should be provided.



EV-Ready Codes for the Built Environment



EV-Ready Codes document is an overview of building and electrical codes and their relation to EVs, highlighting best practices from around the country.

- 🚗 Existing codes do not present a significant barrier to electric vehicle supply equipment (EVSE) deployment.
- 🚗 There is room within the codes to encourage EV-readiness.
- 🚗 Codes can create a high-level planning framework while retaining flexibility at the local level.
- 🚗 Adopting EV-friendly codes should be part of a collaboration between partners to create a comprehensive EVSE deployment strategy.

Creating EV Ready Towns and Cities (Planning and Policy Tools)



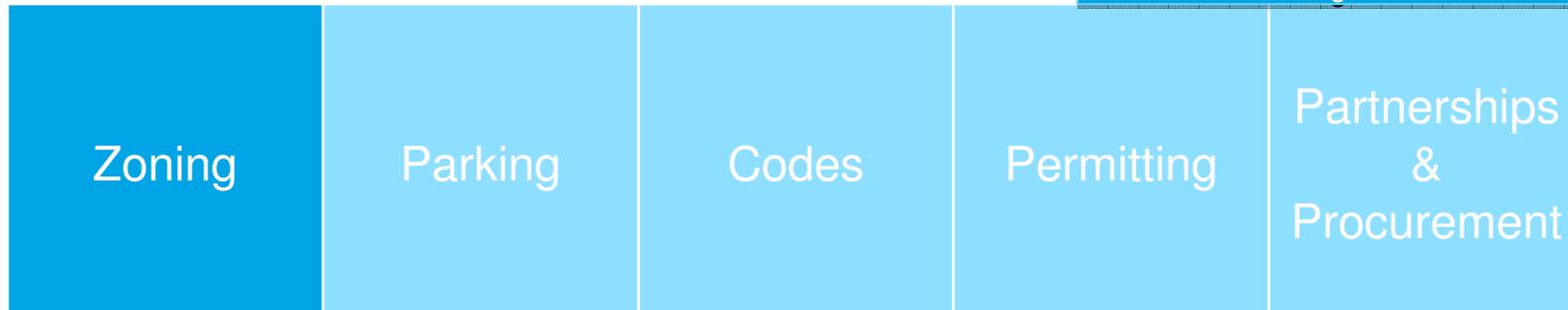
Zoning actions can:

- Permit EVSE in logical locations;
- Establish clear delimitations and use groups for EV and EVSE;
- Set out high-level criteria for design, accessibility, and parking enforcement;
- Require or incentivize EVSE in certain areas.

•**Methuen, Massachusetts** adopted an addendum to the city zoning resolution that specifies permissible use of level 1 and level 2 charging stations in residential zones.

•Level 1 and 2 permitted as accessory uses to parking facilities in all areas.

•Level 3 or DC fast charge permitted as principal use in commercial or industrial zones or conditional use in general.



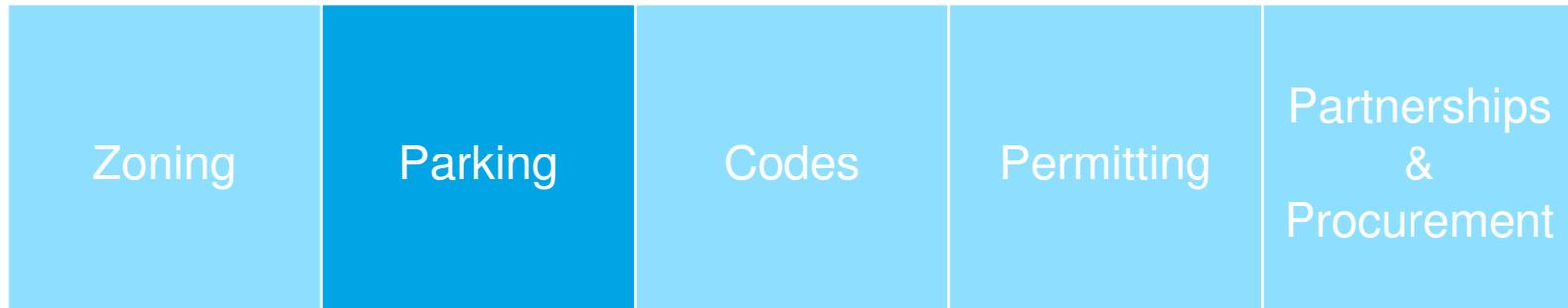
Creating EV Ready Towns and Cities (Planning and Policy Tools)



Municipalities can use parking ordinances to:

- Scope EVSE pre-wiring or installation;
- Set standards for on-street EV charging and parking;
- Provide guidance on how best to manage user rotation, access, and violations.

•**Price Chopper**, the supermarket chain, has instituted EV-only parking with charging stations that include a marketing-oriented canopy design, and have located their stations near store entrances.

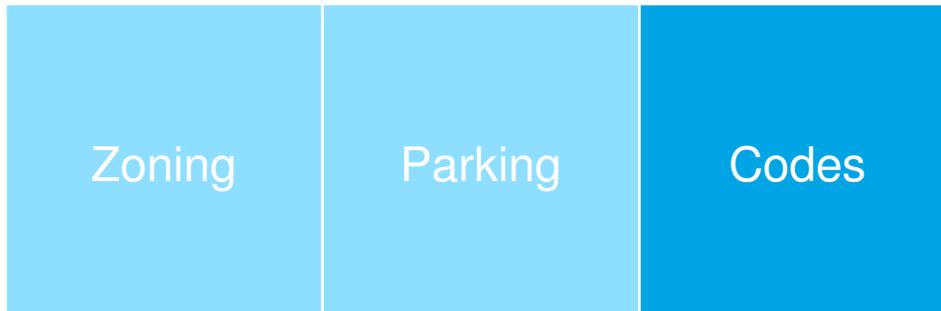


Creating EV Ready Towns and Cities (Planning and Policy Tools)



Building and electrical codes can set standards for safety and scope of EVSE deployment by:

- specifying coding requirements that set numerical or percentage-based goals or limits for certain features in new construction;
- providing for new permitting or inspection protocols.



EV Readiness: Phasing and Tiers

Voluntary/Mandatory: Requirements included as an optional appendix; voluntary requirements create consistency among jurisdictions that choose to adopt.

Local and Developer Burdens: Code language should be enforceable in the local jurisdiction and not cause undue local burdens.

Tiered Codes: Optional appendices to the building code should be structured with additional options, or tiers, that set standards for increasing levels of participation and enforcement.

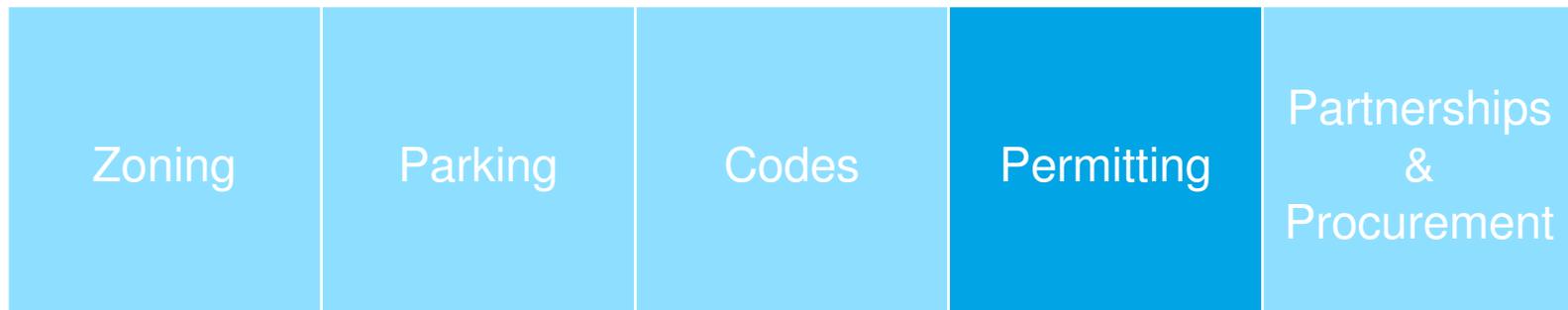
Pilot Phases: Test new codes and allow contractors, inspectors and other local stakeholders to develop a knowledge base prior to full enforcement of any new code.

Creating EV Ready Towns and Cities (Planning and Policy Tools)



Localities can make it easier to install EVSE by streamlining permitting.

- Standardizing and minimizing permitting cost;
- Classifying EVSE installation as “minor work;”
- Providing a permitting template or online permitting to applicants;
- Ensuring that inspections are conducted in a timely manner.



Creating EV Ready Towns and Cities (Planning and Policy Tools)

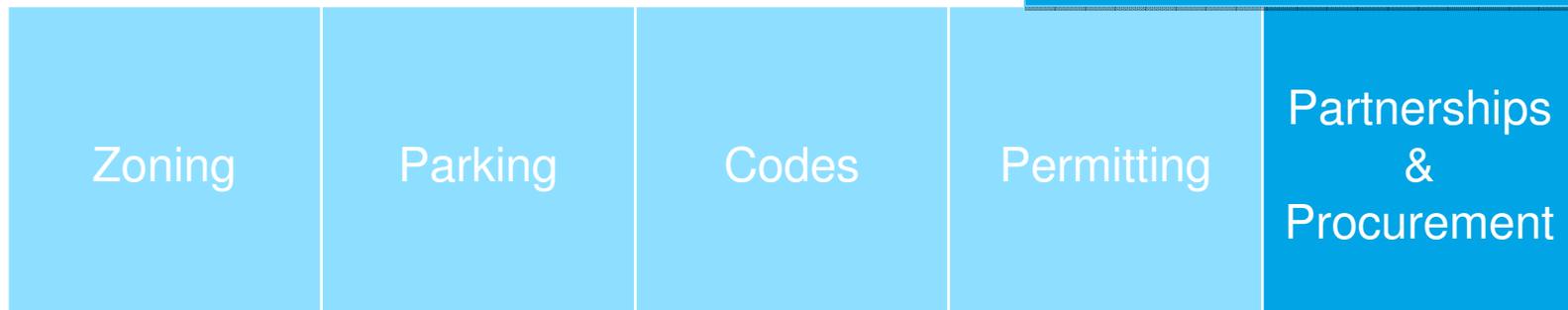


Diverse partnerships can strengthen the EV planning process.

- Private companies, utilities, municipalities, MPOs should be involved to help a community become EV-ready.
- Procurement policies can be used to require the government to purchase EVs as part of any procurement process.

•EV Partnerships include:

- Maryland Electric Vehicle Infrastructure Council*
- Project Get Ready Rhode Island*
- Connecticut Electric Vehicle Infrastructure Council*



Information for Multi-Unit Dwelling Stakeholders



Nearly one-third of all residents live in multi-unit dwellings in the Northeast and Mid-Atlantic states.

Many apartment and condominium complexes are installing EV charging stations as an added amenity for their residents.

The Bozzuto Group installed two charging stations for residents and the public at the Fitzgerald, an apartment community located in Baltimore.



ANOTHER FIRST FOR THE FITZGERALD
Public Parking Garage A New Hub For
Rechargeable Electric Vehicles

You are invited to join The Bozzuto Group and SemaConnect for a "plug-in" ceremony that will unveil the Mid-Atlantic's first public vehicle electric charging stations in a residential building.



Be Part of the Solution

Information for Utilities



Be Part of the Solution

Working Together to Get Ready for Electric Vehicles

The majority of electric vehicle (EV) drivers plug in at home overnight, during off-peak hours. As the number of EVs increase, home charging will increase and businesses and public EV chargers will become more common. Electric utilities in the Northeast and Mid-Atlantic can prepare for this increase in electricity demand by understanding how EVs will affect their service territory, working with local stakeholders, and adopting EV-friendly policies.

Resources for Utilities

The Transportation and Climate Initiative (TCI), a collaboration of Northeast and Mid-Atlantic state transportation, environment, and energy agencies, has developed a suite of documents to help communities become EV-ready as part of its Northeast Electric Vehicle Network project. Utilities may wish to reference these documents when considering electric vehicle supply equipment (EVSE) policies in the Northeast and Mid-Atlantic. These resources include:

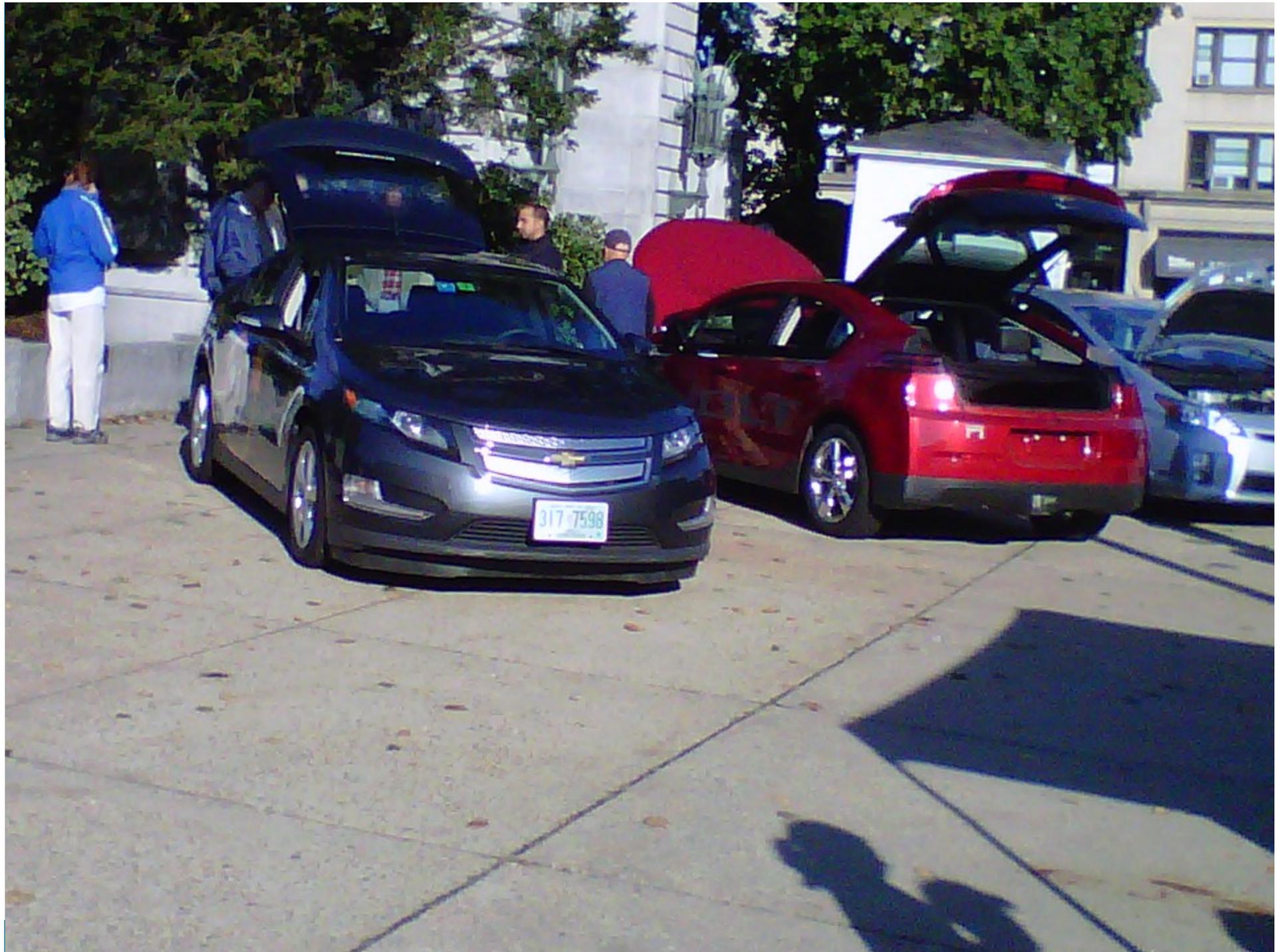
- **EV-Ready Codes for the Built Environment.** Provides an overview of building and electrical codes, how they relate to EVs, highlights best practices from around the country, and makes recommendations for Northeast and Mid-Atlantic jurisdictions.
- **Siting and Design Guidelines for Electric Vehicle Supply Equipment.** Identifies and diagrams key siting and design issues that are relevant to local governments, developers, homeowners, businesses, utility providers, and other organizations.
- **Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools.** Provides discussion and guidance regarding the process of creating, administering, and amending planning processes, rules, and regulations, and explores the potential for jurisdictions to adopt practices that encourage EVSE.
- **Plug-In Electric Vehicle Deployment in the Northeast: A Market Overview and Literature Review.** Assesses current EV and EVSE technology, looks at the state of EV markets, reviews the benefits of EV deployment, and identifies barriers and challenges to EVs in gaining market acceptance, including EVs' impact on the grid.

EV Issues for Utilities

Utilities will be affected by wide-scale adoption of EVs in a variety of ways. Issues that utilities and public service commissions should be aware of include:

- **Impact on local distribution network.** EVs will increase demand on the grid and local distribution networks. To prepare for this, utilities can survey their infrastructure and determine the potential effect that a large influx of EVs would have on their networks.
- **Tracking EV purchases of its customers.** As EVs become more popular, utilities may want to explore ways to track EV purchases in order to anticipate future EV charging station installations and the need for upgrades to electricity service and distribution systems.
- **Installation and metering requirements for charging stations.** Installing a Level 2 (240 volt) charging station may require an electrical upgrade or separate meter. Utilities can explore how they will facilitate charging station installation and electrical upgrades.
- **Resale of power by a third party.** Many states prohibit the resale of electricity by a third party, which can include charging station hosts. As EV charging stations become more widely available, public utility commissions may consider alternative policies to allow the resale of electricity specifically for EV charging.
- **Cost of electricity for EV owners.** EV owners will plug in their cars at different locations at different times, but the majority of charging will take place at home. Utilities can encourage off-peak charging by offering time of use rates to their EV customers.





Web Address



For guidance documents and more information about the Northeast Electric Vehicle Network, please visit:

www.northeastevs.org

For the Alternative Fuels Data Center Station Locator (slide 6) please visit:

www.afdc.energy.gov/locator/stations/



Materials prepared on behalf of the Transportation and Climate Initiative

Information and documents published under the name Transportation and Climate Initiative (TCI) represent work produced in support of the TCI or its projects. TCI materials do not necessarily reflect the positions of individual jurisdictions or agencies unless explicitly stated.

Questions?



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